

Snack from Waste Ingredients: Delichips Banana

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Abstract: *Delichips Banana is a unique new local snack innovation product compared to existing chips in the market. This snack is made from waste ingredients such as the main ingredients, banana stem fiber, and prawn skins. The main objectives of this product are to diversify and enrich the usage of waste ingredients; banana stem fiber and prawn skins. Enhancing the nutrients and aesthetic quality of the snack also is the main objective. The production of the product started with preparing treated banana stems and prawn skins. Then banana stem was fried, tossed, and mix with flavored prawn skins powder sambal sira. This product is marketable, cost-effective, longer shelf-life, and is easy to market as it is packed in a zip-locked pouch. A pair comparison test was conducted (n = 60 untrained panels) using the most and least indicator with 2 different samples (Variation 1 & Variation 2) comprising six attributes such as appearance, color, texture, oil uptake, flavor, and overall acceptance. Results of paired comparison test indicate most of the panels preferred Variation 1 with 33 panels (chips with fried chicken flour and rice flour batter) compared to variation 2 with 27 panels (rice flour batter).*

Keywords: innovation, waste ingredients, batter, marketability



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1. INTRODUCTION

Food waste in Malaysia has continued in recent years in Malaysia. According to the Ministry of Housing and Local Government (MHLG), food wastes have outstripped other solid wastes generated in Malaysia, constituting more than 40 percent of the total wastes disposed of in 2010 (Jereme et al., 2018). Poor municipal solid waste management especially food waste in Malaysia leads to environmental and pollution issues due to the increasing demand for raw materials for quality of life (Mohd & Mashitah, 2013).

Food waste occurs at every stage of the food system from farm to fork (Xue et al., 2017). In developed countries, the largest waste stream is generated at the end of the food chain, including consumer-facing businesses (supermarkets, grocery stores, distribution centers; restaurants; institutional food services) and homes. Food waste especially fruit base is usually processed to be animal feeding as an option to avoid landfilling and other solid waste management processes (Xue et al., 2017).

Banana stem fiber is a vegetable substance that means any plant or part of a plant and includes the stem, root, bark, tuber, rhizome, leaf, stalk, inflorescence, bud, shoot, flowers, fruit, and seed (Food Act, 1983). Banana stems are also classified as fruit waste and are usually discarded after the harvesting season. According to Senior Director of the Fresh Marketing Services Division of the Federal Agricultural Marketing Authority (FAMA) Mohd Anis Mohd Yasin, in 2017, the banana cultivation area recorded 3,489,406 hectares nationwide with a production of 350,492.59 metric tonnes (Bernama, 2019). Many studies have been conducted on the benefits of using banana stem fiber in producing food products, especially the contribution to health advantages (Ma, 2015). The banana stem also has been known to prevent and treat kidney stones (Saha, 2020).

Besides the banana stem fiber, the prawn skins are also being recorded to be a high-value of waste ingredient by-product. Shrimp and prawns are considered one of the most essential fisheries products in Sabah (Flornica & Newati, 2016). The value-added of head and skins of prawns and shrimp which are high in protein and chitin make them available to be medical supplements for lowering the cholesterol level (Hossain & Iqbal, 2014). In the food industry the prawn skins are usually will be discarded and process for animal feeding (Flornica & Newati, 2016). This happened due to unrealizing the benefits of prawn skins and their functions in the food industry processing. To avoid this, the researcher took the initiative to use these waste materials; the banana stem and prawn skins as the main ingredients in making local snack products known as Delichips. In Malaysia, little did they know that banana stem fiber and prawn skins can be consumed and because of that, the researcher incorporate this unique waste ingredient in the product.

2. METHOD & MATERIAL

2.1 Materials

Material of Delichips Banana, such as Banana stem fiber was obtained from a local farmer in Dungun. Meanwhile, prawn skins and other materials such as fried chicken flour, rice flour, oil, salt, sugar, prawn/ shrimp, dried chili, tamarind, and chicken stock were obtained from the oriental kitchen, Faculty of Hotel and Tourism Management UiTM Dungun, Terengganu.

2.2 Methodology

2.2.1 Preparation of treated prawn/ shrimp skin seasoning

Peel the prawn/ shrimp and separate the skin, wash them and soak for 1 hour with salt water (4 cups of water and 90g of salt). Then strain the prawn/ shrimp and place them in a tray and dry them in the oven until completely dry. Grind the skin until well powdered

2.2.2 Preparation of treated banana stem fiber

Wash thoroughly banana stem fiber, thinly slice and cut into a specific size and soak it in salted water. Next, strain the banana stems fiber and dry for a few minutes. Dip a banana stems fiber into the mixture of fried chicken flour and rice flour (a mixture of 2 cups of water, 275g fried chicken flour, and 200g rice flour). Deep fry it until the color turns brown.

2.2.3 Preparation of sira

Cut 50g of dried chilies and boil for 30 minutes. Then the chili was blended with tamarind water (166.6g of water, 8.3g of tamarind). Blend the ingredients for 2 minutes. Heating the oil (37.3g), add all blended ingredients with sugar (90g), and salt (8.3g). Gently stir the ingredients, add 15g shrimp skin powder, and 10g chicken stock powder and cook for 30 minutes. Next, put the fried banana stem fiber and curry leaves into the sira and mix all the ingredients. Stir them until well blended. Then place the mixture in the tray and dry in the oven for a few minutes. Then cool the mixture and pack them in the atmospheric packaging.

3. FINDINGS

3.1 Sensory and Analysis

The sensory evaluation aims to identify the acceptance of customers towards the products based on their appearance, color intensity, texture, oil uptake, flavor, and overall acceptance. For this sensory evaluation pair comparison test was conducted to identify the most and the least product preferred by the untrained panels. Sixty (60) panelists from different backgrounds of the study were used and the samples were coded with a three-digit sample code and arranged based on permutation number to avoid bias. One hundred and twenty (120) samples were used for this sensory evaluation. The samples Variation 1 (V1; chips with fried chicken flour and rice flour batter) and Variation 2 (V2; chip with rice flour batter) were tested.

Based on Table 1, the finding of paired comparison test on overall acceptance indicates most of the panels preferred Variation 1 with 33 panels (chips with fried chicken flour and rice flour batter) compared to Variation 2 with 27 panels (rice flour batter). This is due to Variation 1 being much more flavored and crispy compared to Variation 2.

Table 1. Sensory Evaluation Result Among Panel.

Pair Comparison Test		
Characteristic	Least/ Most indicator	
	V1	V2
Appearance	34	26
Color intensity	36	24
Texture	29	31
Oil uptake	47	13
Flavor	38	22
Overall acceptance	33	27

4. DISCUSSION

4.1 Product design and packaging

Pouch packaging is being used for this product. Preserving the self-life, practicality of handling, and consumption by resealable zipper lock, the weight of pouches is lighter, thus resulting in lower shipping costs the reason why this kind of packaging was applied for this product.



Figure 1. Illustration of Product Packaging.

4.2 Consumer acceptance

The sensory evaluation was performed at Universiti Teknologi MARA Dungun and the students from various courses were chosen as the untrained panel. Based on table 1 pair comparison test was conducted among 60 panels using the least and most indicator with 2 different samples (Variation 1 & Variation 2) comprising six characteristics; appearance, color intensity, texture, oil uptake, flavor, and overall acceptance. Based on the results obtained most of the panels preferred Variation 1 with 33 panels (chips with fried chicken flour and rice flour batter) compared to Variation 2 with 27 panels (rice flour batter). Therefore, Variation 1 was selected to be the selling product as it is the most preferred product compared to Variation 2. This is due to Variation 1 being much more flavored and crispy compared to Variation 2.

5. CONCLUSION

Product waste that is rarely used is the main focus in producing a product like this. A proper methodology and ingredients used play an important role in producing a delicious, crunchy taste and allowing the residue of this product to be used as a snack food that is suitable for all generations. Product waste such as banana stalks is the main idea combined with flavors from shrimp skins that people rarely make. An innovative local product waste can be diversified, marketed, and commercialized also can make the product different and unique in the market. The shelf life of this product also can last a long time due to its crisp texture.

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